

FORM PTO-1390  
(REV 11-2000)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

764-25351 US

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 USC § 371

US APPLICATION NO (If known, see 37 CFR 1.5)

09/806210

INTERNATIONAL APPLICATION NO  
PCT/EP99/07727INTERNATIONAL FILING DATE  
14 October 1999PRIORITY DATE CLAIMED  
20 October 1998

## TITLE OF INVENTION

Data Transmission Method

## APPLICANT(S) FOR DO/EO/US

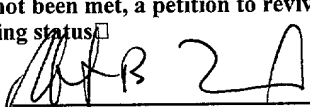
Manfred Keller; Renke Bienert; Ulrich Wursthorn

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

- 1 ☒ This is a **FIRST** submission of items concerning a filing under 35 USC § 371 ☐
- 2 ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 USC § 371 ☐
- 3 ☒ This is an express request to begin national examination procedures (35 USC § 371(f)) ☐ The submission must include items (5), (6), (9) and (21) indicated below ☐
- 4 ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31) ☐
- 5 ☒ A copy of the International Application as filed (35 USC § 371(c)(2))
- a ☐ is attached hereto (required only if not communicated by the International Bureau) ☐
- b ☒ has been communicated by the International Bureau ☐
- c ☐ is not required, as the application was filed in the United States Receiving Office (RO/US) ☐
- 6 ☒ An English language translation of the International Application as filed (35 USC § 371(c)(2)) ☐
- a ☒ is attached hereto ☐
- b ☐ has been previously submitted under 35 USC § 154(d)(4) ☐
- 7 ☐ Amendments to the claims of the International Application under PCT Article 19 (35 USC § 371(c)(3))
- a ☐ are attached hereto (required only if not communicated by the International Bureau) ☐
- b ☐ have been communicated by the International Bureau ☐
- c ☐ have not been made; however, the time limit for making such amendments has NOT expired ☐
- d ☐ have not been made and will not be made ☐
- 8 ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 USC § 371(c)(3)) ☐
- 9 ☒ An oath or declaration of the inventor(s) (35 USC § 371(c)(4)) ☐
- 10 ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 USC § 371(c)(5)) ☐

## Items 11 to 20 below concern document(s) or information included:

- 11 ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98 ☐
- 12 ☒ An assignment document for recording ☐ A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included ☐
- 13 ☐ A **FIRST** preliminary amendment ☐
- 14 ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment ☐
- 15 ☐ A substitute specification ☐
- 16 ☐ A change of power of attorney and/or address letter ☐
- 17 ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter<sup>2</sup> and 35 USC § 821 - 1.825 ☐
- 18 ☐ A second copy of the published international application under 35 USC § 154(d)(4) ☐
- 19 ☐ A second copy of the English language translation of the international application under 35 USC § 154(d)(4) ☐
- 20 ☐ Other items or information:

US APPLICATION NO. <b>09/806210</b> INTERNATIONAL APPLICATION NO.		ATTORNEY'S DOCKET NUMBER	
21 <input checked="" type="checkbox"/> The following fees are submitted: <b>BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):</b> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO <input type="text"/> \$1000.00  International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO <input type="text"/> \$860.00  International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO <input type="text"/> \$710.00  International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) <input type="text"/> \$690.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) <input type="text"/> \$100.00 <b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>		<b>CALCULATIONS PTO USE ONLY</b>	
		\$ 860.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)) <input type="checkbox"/>		\$	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	5 - 20 =	0	x \$18.00
Independent claims	1 - 3 =	0	x \$80.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)		+ \$270.00	\$ 270.00
<b>TOTAL OF ABOVE CALCULATIONS =</b>			\$ 1,130.00
<input type="checkbox"/> Applicant claims small entity status <input type="checkbox"/> See 37 CFR 1.27 <input type="checkbox"/> The fees indicated above are reduced by 1/2 <input type="checkbox"/>			\$
<b>SUBTOTAL =</b>			\$ 1,130.00
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)) <input type="checkbox"/>			\$
<b>TOTAL NATIONAL FEE =</b>			\$ 1,130.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)) <input type="checkbox"/> The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) <input type="checkbox"/> \$40.00 per property +			\$
<b>TOTAL FEES ENCLOSED =</b>			\$ 1,130.00
			Amount to be refunded: \$
			charged: \$
a <input type="checkbox"/> A check in the amount of \$ _____ to cover the above fees is enclosed <input type="checkbox"/> b <input checked="" type="checkbox"/> Please charge my Deposit Account No. <u>01-1125</u> in the amount of \$ <u>1,130.00</u> to cover the above fees <input type="checkbox"/> A duplicate copy of this sheet is enclosed <input type="checkbox"/> c <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>01-1125</u> <input type="checkbox"/> A duplicate copy of this sheet is enclosed <input type="checkbox"/> d <input type="checkbox"/> Fees are to be charged to a credit card <input type="checkbox"/> <b>WARNING:</b> Information on this form may become public <input type="checkbox"/> <b>Credit card</b> <b>information should not be included on this form</b> <input type="checkbox"/> Provide credit card information and authorization on PTO-2038 <input type="checkbox"/>			
<b>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</b>			
SEND ALL CORRESPONDENCE TO:  Robert B. Leonard Honeywell International Inc. 101 Columbia Road Morristown, NJ 07962			
 SIGNATURE Robert B. Leonard NAME 33,946 REGISTRATION NUMBER			

1/PR-15

09/806210  
JC03/Rec'd PCT/PTO 27 MAR 2001

WO 00/24172

PCT/EP99/07727

Data transmission method

ET 181709210 US

The present invention relates to a method for asynchronous serial data transmission as claimed in the preamble of patent claim 1.

In this context, it is known for a carrier identification and synchronization to be sent in advance of user data transmitted between a transmitter and a receiver. The carrier identification signals to the receiver that a message is being sent, and the synchronization is used to synchronize to the start of the user data, that is to say to the start bit preceding this user data.

The simplest form of transmitter and receiver synchronization is used for asynchronous transmission. The transmitter clock and the receiver clock in this case need be only at approximately the same frequency. The transmitted data words have a fixed format, and are also provided with a start bit and a stop bit. The receiver clock is synchronized to the negative edge of the start bit, and the other bits are sampled in the center of the bit time period.

Asynchronous data transmission can also be carried out with low-cost standard modules, such as those marketed by various manufacturers in the form of UARTs (Universal Asynchronous Receiver Transmitter). These have internal clocks whose time constancy is not subject to any particularly stringent requirements, since the clock is in each case resynchronized at the start of a character, that is to say in general after the transmission of 10 bits. Thus, all that is necessary is for the stop bit still to be sampled during the bit period.

For data transmission, it is also important for the transmitting/receiving electronics to have a constant

operating point, and for the operating point not to be shifted, for example, due to lengthy sequences of zeros or ones in the character coding. This could be ensured by using coding formats without any direct-current element, but in some cases these are too complex and cannot be evaluated by UARTs.

The object of the present invention is thus to specify a data transmission method which ensures that the transmitting/receiving electronics have a constant operating point, while using a simple coding format.

This object is achieved by the description features of patent claim 1. Further advantageous refinements of the method according to the invention can be found in the dependent claims.

The invention will be explained in more detail in the following text with reference to an exemplary embodiment which is shown in the figures of the attached drawing, in which:

Figure 1 shows the composition of the transmitted data stream;

Figure 2 shows the fundamental character coding;

Figure 3 shows the coding of the carrier identification;

Figure 4 shows the coding of the synchronization character; and

Figure 5 shows the coding of the user data.

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As shown in figure 1, the bit stream used for the transmission method is composed, in a known manner, of a carrier identification, synchronization and the user data. Each part of this bit stream is composed, as shown in figure 2, of a character with a width of 10 bits, with the first bit being a start bit and the last bit being a stop bit. The start bit is represented by a "0", and the stop bit is represented by a "1".

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In between, there are eight information bits for the character.

As shown in figure 3, the carrier identification is coded based on the hexadecimal code 55, that is to say ones and zeros alternate with one another. The bit rate is, for example, 9 600 baud, which corresponds to a frequency of 4.8 kHz. The internal clock in the UART also operates at this bit rate or frequency for sampling the character bits.

As shown in figure 4, the synchronization character is coded using the hexadecimal code 33, that is to say two ones are in each case followed by two zeros etc. This code is symmetrical, as far as the number of ones and zeros is concerned, so that the direct-current level and the operating point of the receiving electronics do not change, on average, and with the frequency of 2.4 kHz still being sufficiently high for radio transmission. Furthermore, the synchronization character is chosen such that its bit pattern does not occur in the user data.

As shown in figure 5, the user data are coded using Manchester coding (bi-phase format), in which both the zeros and the ones are coded by pulses, although these occur at different times within a bit frame. For example, a one is represented by a square-wave pulse with half the step duration which is located in the first half of the time period available for representation of a bit. The same pulse is used to represent the zero, but in this case is located in the second half of the time period. The Manchester code thus ensures the transmission of clock information as well in the "0" and "1" sequences, and it is possible to distinguish between the transmission of a series of zeros and no transmission. Although the signal does have a direct-current component, its level is the same, however, on average.

- Since each zero or one is coded by means of a pulse having half the step width of the carrier frequency of 4.8 kHz, a byte with 8 bits cannot be coded in one character; in fact, two characters each preceded by a start bit and followed by a stop bit are required to transmit one byte, which represents a special feature of the present invention.
- 10 For example, in the example illustrated in figure 5, the user data are coded in the hexadecimal code 21.

HONEYWELL AG  
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Patent claims:

1. A method for asynchronous serial data transmission between a transmitter and receiver, via a radio transmission path, with the user data frame being preceded by a synchronization data frame and a carrier identification data frame, and the data frames each being enclosed by a start bit and stop bit at the start and end, distinguished by all the data frames being coded in such a way that there are an identical number of 0 bits and 1 bits, including the start and stop bits, wherein the carrier identification is coded by means of the bit rate of the information transmission, wherein the synchronization data frame has a coding based on half the bit rate, and wherein the user data frame is coded using Manchester coding.
2. The method as claimed in claim 1, wherein the user data is in each case coded by two half bytes comprising four Manchester-coded bits transmitted sequentially, with each half-byte being enclosed by a start bit and a stop bit.
3. The method as claimed in claim 1 or 2, distinguished by the carrier identification being coded based on the hexadecimal code 55, and the synchronization character being coded based on the hexadecimal code 33.
4. The method as claimed in one of the preceding claims, distinguished by the use of UARTs for processing 10-bit frames each having a start bit, 8 data bits and a stop bit, with the frequency of

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AMENDED SHEET





Fig. 1

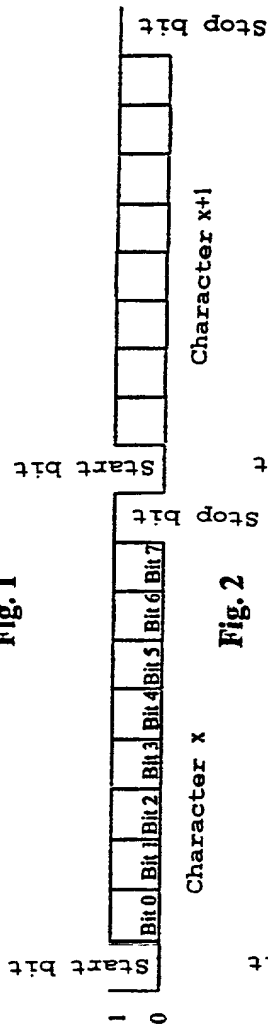


Fig. 2

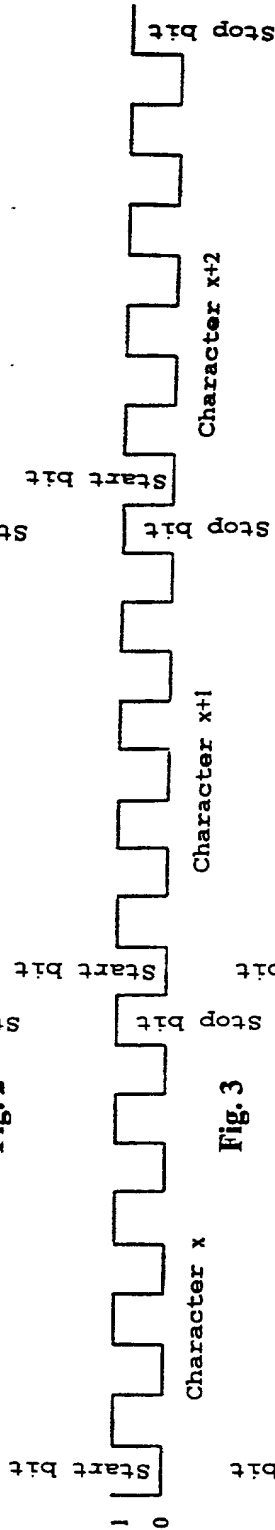


Fig. 3

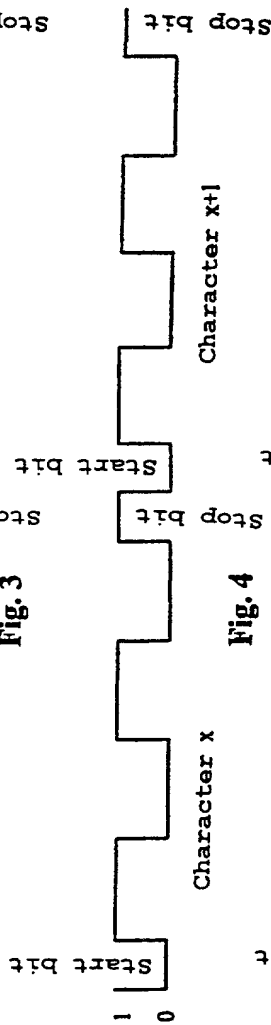


Fig. 4

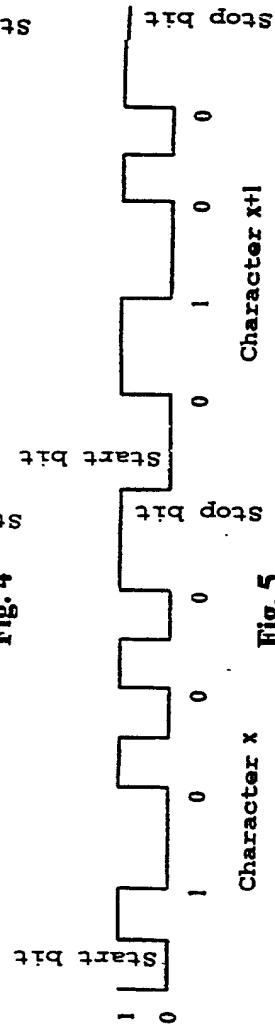


Fig. 5

As a below named inventor, I hereby declare that:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

The specification of which

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).\*

I hereby claim foreign priority benefits under Title 35, United States Code §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

<b>Prior Foreign Application(s)</b>						<b>Priority Claimed</b>	
<u>(Number)</u>	<u>(Country)</u>	<u>(Day/Month/Year Filed)</u>		<u>Yes</u>	<u>No</u>		

I hereby claim the benefit under Title 35, United States Code §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)

As named inventors, we hereby appoint the registered practioner(s) under Customer Number 000128 to prosecute this application and to transact all business in the Patent and Trademark Office herewith.

Direct all correspondence to: Customer I.D. No. 000128

Direct all telephone calls to: Robert B. Leonard 763-954-5389

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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or Joint Inventor

Manfred Keller

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\*Title 37, Code of Federal Regulations §1.56:

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of

any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application;

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.